

Customer No.: 31561
Application No.: 10/063,575
Docket No.: 8318-US-PA

REMARKS

Present Status of the Application

The Office Action dated April 14, 2004, rejected claims 13-34 under 35 U.S.C. § 103(a) as being unpatentable by Baker (US 5,508,229) in view of Mis et al., (US 5,767,010), and further in view of Seshan (US 6,521,996). Applicant respectfully submits that the presently pending claims 13-34 are already in conditions for allowance. Reconsideration and withdrawal of the Examiner's rejection are earnestly requested.

Response to Rejections under 35 U.S.C. § 103(a)

The Office Action rejected claim 13-34 under 35 U.S.C. § 103(a), as unpatentable over Baker (US 5,508,229) in the view of Mis et al., (US 5,767,010), and further in view of Seshan (US 6,521,996).

The Office Action considers that Baker teaches substantially the chip except for teaching the copper bonding pads, and the Office Action relies on Mis et al. (contact pad [24]; column 3, lines 53-57) to teach the copper bonding pad. Further, noted by the Office Action, Baker and Mis fail to show the material of the adhesive layer is titanium-tungsten alloy. The Office Action relies on Seshan for teaching the adhesive layer (224) of titanium-tungsten alloy or chromium. Applicants respectfully traverse the rejections for at least the reasons set forth below.

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In fact, Baker merely discloses the structure having an aluminum bonding pad (32) covered by an aluminum adhesive layer (36) (column 3, lines 25-27). Baker fails to teach or suggest the bonding pad containing copper.

The Office Action asserts that it would be obvious to one having ordinary skill in the art at the time the invention was made to select the copper contact pad.

Mis et al. discloses the bonding pad (contact pad 24) is covered by a titanium barrier layer (28) (column 4, lines 3-5). As emphasized by Mis, "The use of the titanium barrier layer allows the under bump metallurgy layer to be efficiently removed after the reflow step while reducing the incidence of residues which could form electrical shorts between solder bumps. ..." (column 7, lines 1-4). From Mis's teachings, the titanium barrier layer directly on the bonding pad is necessary so as to achieve the above-mentioned advantage. Therefore, regarding the teachings of Mis as a whole, even if the aluminum bonding pad of Baker would be modified according to the teachings of Mis, a copper bonding pad with a titanium barrier layer directly thereon should be achieved. Furthermore, Baker recited that "... In prior art practices, each layer, i.e., the Cu layer, the NiV layer, and the Al layer, would have to be etched in separate etching steps with a cleaning step performed in between each etch. In the present invention, all three metal layers are etched during one step using a dilute phosphoric acid solution. ..." (column 4, lines 51-56). If Baker is combined with Mis, the titanium barrier layer directly on the copper bonding pad may be not etched with the upper three metal layers in one etching step, which is thus against the objectives of Baker. Going against the objectives of the Baker teaches against the proposed combination. Indeed, it is improper to combine references where to modify the

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primary reference would "destroy its structural identity and mode of operation" *Ex parte Jackson*, 146 USPQ 409, 410 (PTO Bd. App. 1964).

Correspondingly, even if the combination of Baker and Mis is modified by Seshan, titanium-tungsten alloy or chromium layer of Seshan is formed on the titanium layer that covers the copper bonding pad. Since the titanium-tungsten alloy or chromium adhesive layer is not disposed directly on the bonding pad but disposed on the titanium barrier layer, there is no motivation for one skilled in the art to consider using the titanium-tungsten alloy or chromium adhesive layer for good adhesion.

Thus, one skilled in the art would not consider combining Baker with Mis and Seshan, and even if combined, the combination fails to arrive at the invention as claimed in independent claims. As a result, Applicant submits that amended independent claims patently define over the cited reference. Consequently, dependent claim 14-16, 18-20, 21-26, and 29-34 are patentably distinguishable over the cited references for at least the same reasons as the independent claims, from which these claims respectively depend, as well as for the additional features that these claims recite.

Accordingly, reconsideration and withdrawal of the 103 rejections are respectfully requested.

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CONCLUSION

For at least the foregoing reasons, it is believed that the pending claims 13-34 are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

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Respectfully submitted,

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